

Open File Envelope

No. 5158

EL 1137

BALLARA

**FIRST AND FINAL PROGRESS REPORT TO LICENCE
SURRENDER, FOR THE PERIOD 28/4/1983 TO 27/7/1983**

Submitted by
BHP Minerals Ltd
1983

© 30/11/1983

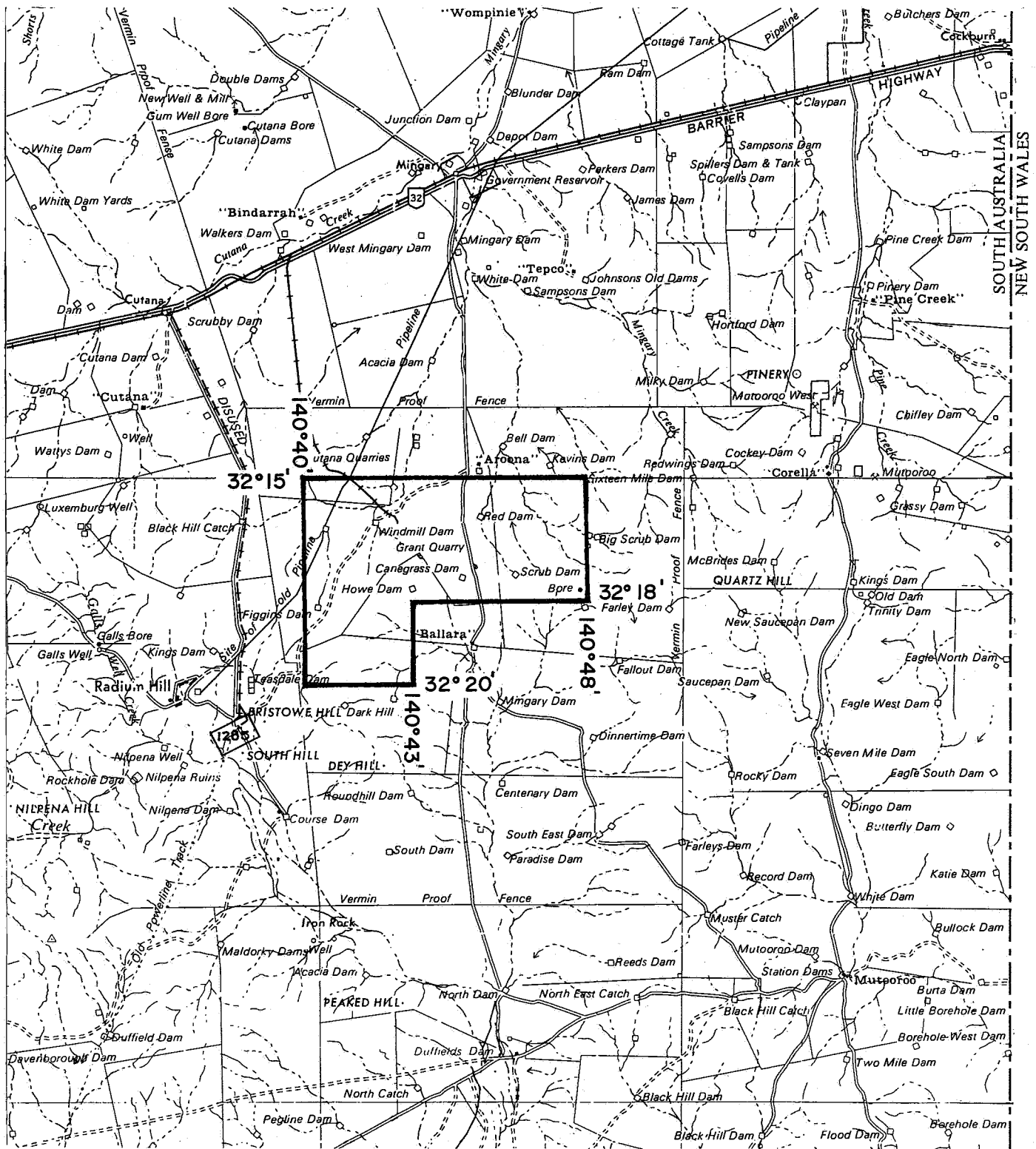
This report was supplied as part of the requirement to hold a mineral or petroleum exploration tenement in the State of South Australia.
PIRSA accepts no responsibility for statements made, or conclusions drawn, in the report or for the quality of text or drawings.
This report is subject to copyright. Apart from fair dealing for the purposes of study, research, criticism or review as permitted under the Copyright Act, no part may be reproduced without written permission of the Chief Executive of Primary Industries and Resources South Australia, GPO Box 1671, Adelaide, SA 5001.

Enquiries: Customer Services Branch
Minerals and Energy Resources
7th Floor
101 Grenfell Street, Adelaide 5000

Telephone: (08) 8463 3000
Facsimile: (08) 8204 1880



Government of South Australia
Primary Industries and Resources SA



SCALE 1:250,000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

SURRENDERED

APPLICANT: BHP MINERAL LIMITED

DM: 395/82

1:250000 PLANS: OLARY

LOCALITY: BALLARA AREA - Approximately 35 kilometres east of Olary.

DATE GRANTED: 28.4.83

DATE EXPIRED: 27.4.84

AREA: 87 square kilometres (approx.)

EL No: 1137

CONTENTS ENVELOPE 5158

TENEMENT: E.L. 1137 - Ballara.

TENEMENT HOLDER: BHP Minerals Ltd.

REPORT: Final Report For Quarter Ended 28th July 1983. Pgs. 3-10

PLANS: Location Map. Drg. No. A4-2418. Fig. 1. Pg. 5
Gravity Readings. Drg. No. A3-1639. Fig. 3. Pg. 11
Location Of Percussion Drill Hole. Drg. No. Pg. 12
A3-1641. Fig. 2.

APPENDIX 1 Lithological Drill Logs For BAL-P1 To Pgs. 13-19
BAL-P7.

APPENDIX 2 Petrological Report. Pgs. 20-24

APPENDIX 3 Downhole Geophysical Logs For BAL-P1 To Pgs. 25-32
BAL-P7. Drg. Nos. A4-265 To A4-271.

APPENDIX 4 Geochemical Results. Pgs. 33-34

EXPLORATION LICENCE 1137

BALLARA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 28 JULY, 1983

FINAL REPORT

CONTENTS

1. GENERAL INFORMATION
2. FIELD INVESTIGATIONS
3. RESULTS
4. CONCLUSIONS AND RECOMMENDATIONS
5. EXPENDITURE

FIGURES

- | | |
|---------------------------|---------|
| 1. Location Map | A4-2418 |
| 2. Location of Drillholes | A3-1641 |
| 3. Gravity Readings | A3-1639 |

APPENDICES

1. Lithological Drill Logs for BAL-P1 to BAL-P7
2. Petrological Report
3. Downhole Geophysical Logs for BAL-P1 to BAL-P7
4. Geochemical Results

BALLARA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 28TH JULY, 1983

FINAL REPORT

1. GENERAL INFORMATION

1.1 Exploration Objective

Exploration Licence 1137 was acquired to test the prospectivity of an annular aeromagnetic anomaly for base metal mineralisation. A mineralised skarn, a structural basin of Broken Hill-type BIF or even an Olympic Dam-style occurrence were considered possibilities.

1.2 Title

Exploration Licence 1137 of some 88 square kilometres was granted to BHP Minerals Limited on 28th April, 1983 for one year. The location of the licence area is shown in Figure 1.

1.3 Geology

E.L. 1137 encloses an area of poor outcrop. As the Mingary 1:100,000 geology map (preliminary copy, SADME) indicates, the Pre-Cambrian rocks are largely masked by Quaternary sands, gravels and clays and by Cainozoic (possibly Tertiary) ironstone deposits which previously have been quarried. Foliated quartzite, minor amphibolite and ferruginous "sandstone" outcrops are spatially associated with the "Tertiary" ironstone

0007

deposits. These lithologies have been mapped as Cutana Beds and have been interpreted as basal Adelaidean (Willouran) sediments. As such they would occur stratigraphically well below the Sturtian ironstones of the Adelaidean sequence. However, Willyerpa Formation (Sturtian) is noted as outcropping just to the west of E.L. 1137. Underlying the Cutana Beds are the various schists and gneisses of the Willyama Metamorphic Complex. Well to the southwest (by some 60 km) the Ordovician Anabama Granite outcrops.

1.4 Geophysics

A high quality aeromagnetic survey which includes E.L. 1137 and its setting has been published. This survey was completed by Georex P/L for SADME (1978) and has east-west flight lines at 250 metre spacing. There are at least three interesting aeromagnetic features within E.L. 1137. The first involves an abrupt change in the character of the magnetic pattern either side of a southwest to northeast oriented linear zone which in part passes through the licence. To the northwest of this rather obvious pattern break is a zone of complicated magnetics which is caused by northeast-trending Willyama complex rocks and which is consistent with a variably magnetic and deformed metamorphic terrain. To the southeast a distinct area of relatively quiet magnetics, still with northeast trends and still related to mapped Willyama rocks, occurs.

The second feature of interest is the circular, or rather annular, magnetic anomaly which is the target anomaly dominating the central northern portion of the licence area. This anomaly shows some coincidence with outcrops mapped as Cutana Beds.

Thirdly, the anomaly is bounded by two parallel magnetic lineaments, presumably reflecting significant faults, which trend northwest for at least 30 kilometres. A positive gravity anomaly of some 5 mgals (BMR data) is indicated in the vicinity of the aeromagnetic anomaly.

1.5 Previous Exploration

Investigations of previous exploration reports indicated that source rocks for the aeromagnetic anomaly had not previously been drilled or otherwise identified. Considerable work, in particular immediately to the south and east of E.L. 1137, has previously been (and is currently being) undertaken to locate Broken Hill-style mineralisation. Radium Hill Mine is located 4 kilometres west of the southwest corner of E.L. 1137.

2. FIELD INVESTIGATIONS

2.1 Reconnaissance

Initial reconnaissance work included some geological scouting to locate any outcropping sources(s) for the target aeromagnetic anomaly and provided the opportunity for some liaison with landholders.

2.2 Geophysics

Further magnetic work was not warranted in view of the pre-existence of high quality data. An orientation gravity survey (with station locations controlled by aerial photographs and with barometric levelling) was conducted to determine whether a significant gravity anomaly existed that would require further resolution by a grid-controlled, optically levelled survey. Ultimately, this latter survey was considered not to be warranted. All drillholes were down hole gamma logged. As all the holes were dry, electrical logging was not done.

2.3 Drilling

Since magnetic source rocks were not found outcropping, it was decided to drill a series of percussion holes to test the magnetic anomaly. Although the results of the gravity survey were considered, the drillholes were sited principally to intersect shallow magnetic sources in four segments of the anomaly having individual characteristics. The location of the seven percussion holes is presented in Figure 2.

3. RESULTS

The aeromagnetic anomaly was interpreted to be caused by a shallow, basin-like body of magnetic rock. The results of the gravity survey are presented in Figure 3. The gravity anomaly is apparently of 6-8 mgals intensity and is not inconsistent with the BMR data. It is also not inconsistent with a shallow basin-like dense source.

The drilling intersected phyllitic to schistose, pelitic (+ magnetic) rocks showing some evidence (esp. in the highly magnetic samples) of a possible gradation to silicate facies, phosphatic iron formation. Indeed, BAL-P5 and P6 intersected very iron-rich rocks in meta-jasplitite and magnetite-hematite micaceous phyllite respectively. These rocks are of probable Willyaman age. Lithological logs including base metal geochemical results (of representative, complete fraction samples of 2 metre intervals within bedrock) for the seven drill holes are presented in appendix (1).

A petrological report is presented in appendix (2). All downhole gamma logs are presented in appendix (3). A table of geochemical results (for washed and sieved coarse fraction, bottom of hole samples and some rock samples) is presented in appendix (4).

0010

The occurrence of tourmaline, apatite and magnetite (and some elevated Mn and Zn values) is noted in regard to possible Broken Hill-type (exhalative, sedimentary-hosted phosphatic ironstone-related) mineralisation but other base metal (Cu, Pb, Co) values are low with Pb values very low. Also F and As values are low.

4. CONCLUSIONS & RECOMMENDATIONS

Notwithstanding the recognition of lithologies similar to the main lode horizon at Broken Hill, it was recommended that no further work be undertaken on E.L. 1137 in view of the lack of significant base metal (esp. Pb) geochemistry and in view of the paucity of outcrop. The licence has been surrendered. 7

5. EXPENDITURE

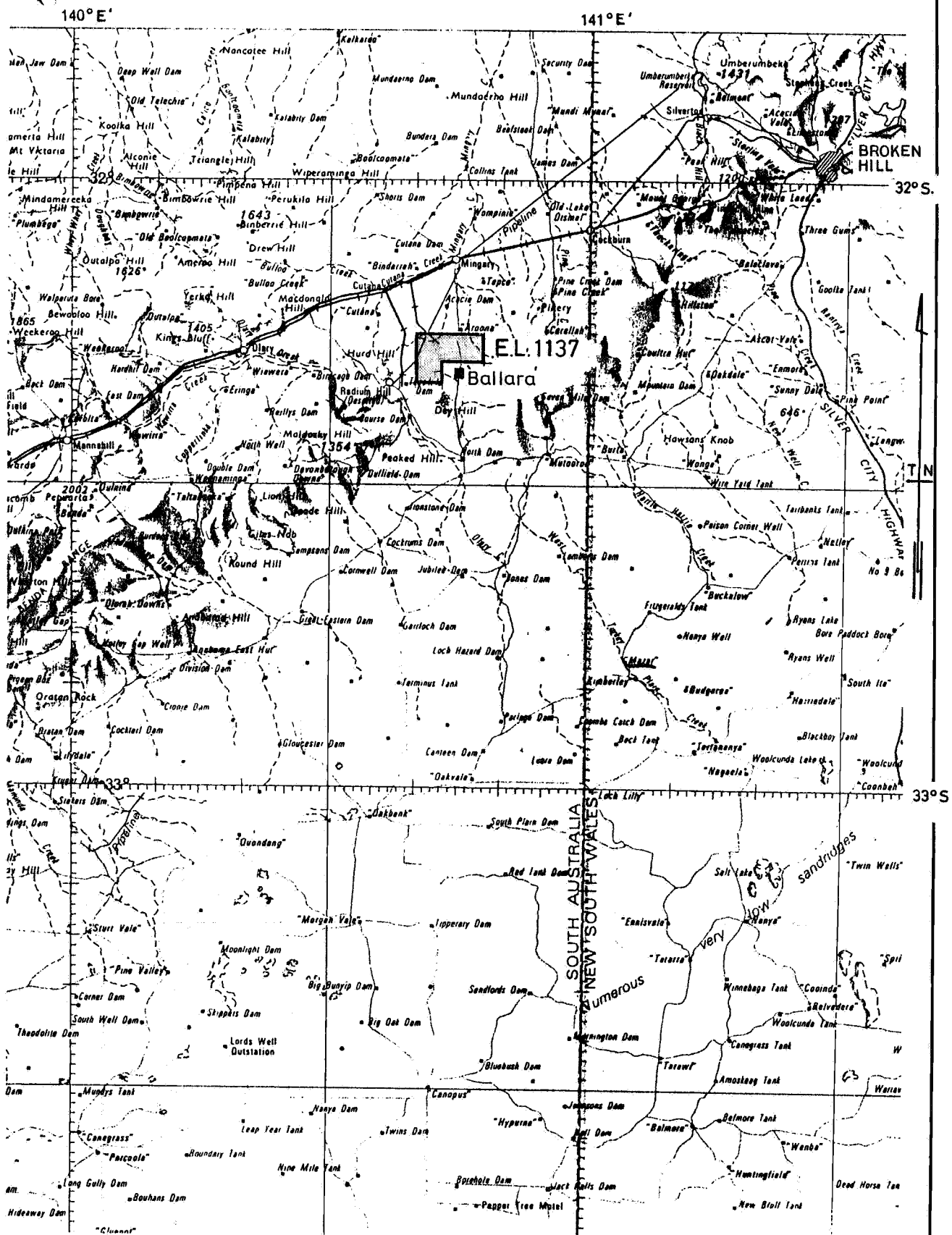
Expenditure debited to E.L. 1137 during the quarter ended 28th July, 1983 was:-

Wages & Salaries	737
Fares & Mobilisation	8
Messing & Accommodation	77
Transport	75
Sample Analysis	373
Tenement Fees	4
Administration & Overheads	127
	<u>1,401</u>

Did my work?

Total expenditure debited to E.L. 1137 was \$1,401.

This report is submitted to the Department of Mines & Energy as required by Condition 4 of E.L. 1137



Scale 1:1,000,000

Note : Map photo copied from Broken Hill 1:1 million topo.

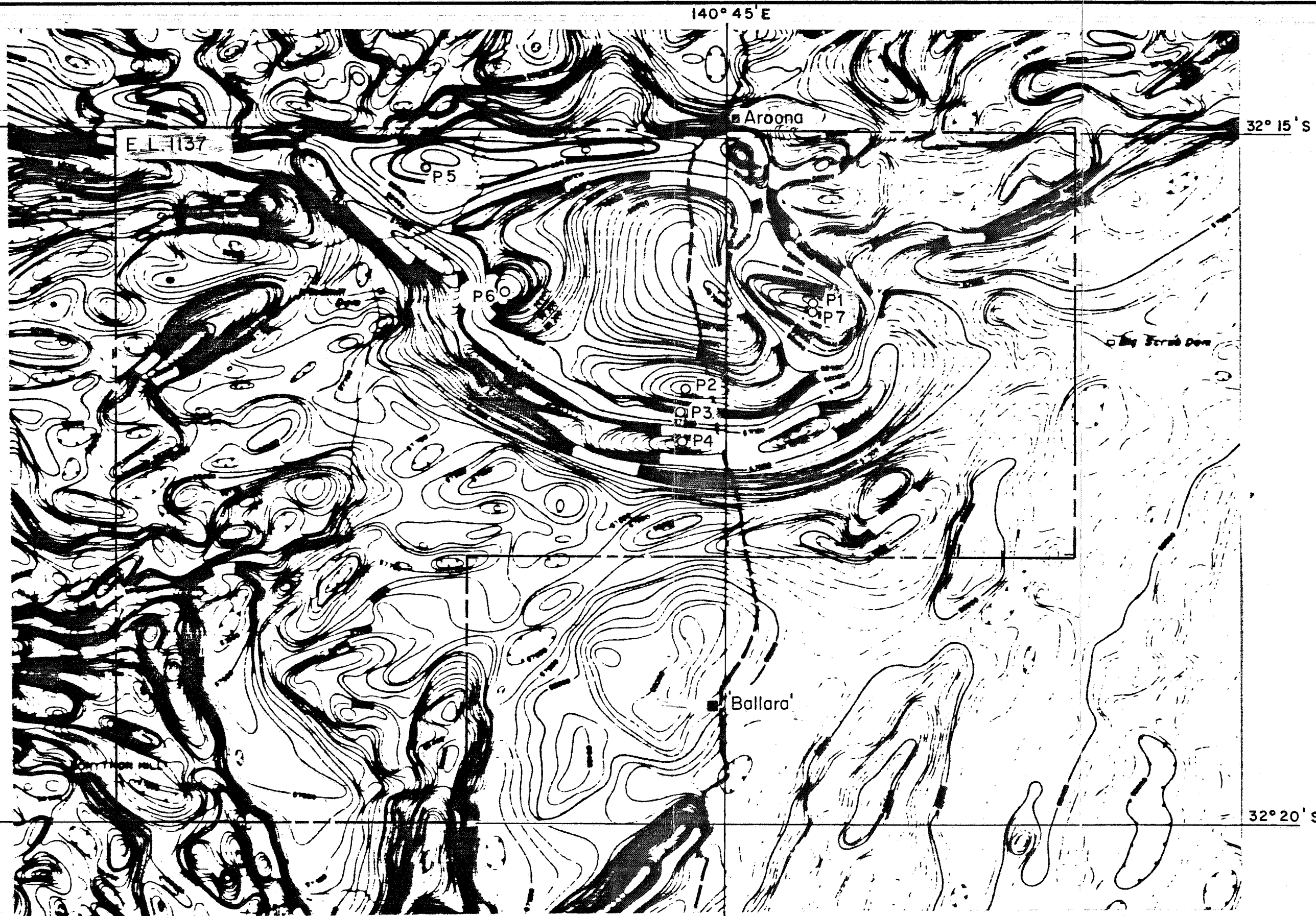
entre
Melbourne

THE BROKEN HILL PROPRIETARY CO. LTD.

E.L. 1137-BALLARA, S.A.
LOCATION MAP

Project No.
K130-1

Drawing No.
A4-2418



SCALE 1:50,000

0 1 2 3 4 5 Km

○ P2 Percussion drill hole (prefixed BAL)

Magnetic contours from Mingary 1:100,000
aeromagnetic map (S.A.D.M.E.)

THE BROKEN HILL PROPRIETARY CO. LTD. EXPLORATION DEPARTMENT			
E.L. 1137, BALLARA, S.A.			
LOCATION OF PERCUSSION DRILL HOLE			
Revisions:	Prepared by:	F. Bunting	
	Date:	30-8-83	
	Drawn:	M.R.	
	Centre:	Melb.	
	Project No:	K13-3	
	Drawing No:	A3-1641	

140°40' E

140°45' E

32°15' S

32°20' S

E.L. 1137

To Mingary and
Broken Hill

Aroona

Base

Ballara

Canegrass Dam

Windmill Dam

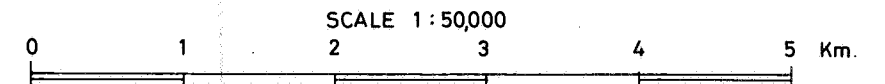
King Dam

old pipeline

dry creek bed



- Gravity station (approx. position) and reading
 - Dam
 - Track or road
 - - - Track - approx. position
 - / - Fence
- Observer : J. Holliday Nov. 82
 Instrument : La Coste and Romberg G598
 Levelling : Barometric with Davidson and
 Negretti & Zambra barometers
 Density : 2.2g. cm⁻³



THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

E.L. 1137 - BALLARA, S.A.
GRAVITY READINGS

Revisions:	Prepared by: J. Holliday	Centre: Melbourne	
	Date: 25.7.83	Project No	Drawing No
	Drawn: C. Osborne	K130-2	A3-1639

APPENDIX 1

Lithological Drill Logs for BAL-P1 to BAL-P7

Project. BALLARA E.L. 1137 (S.A) DRILL HOLE BAL-P2

Angle of depression. VERTICAL Bearing (Mag) == == == S. 32° 16' 49"

Drill Co. NORTH BRIDGE Driller. JOHN HUDSON Drill type. SCHRAMM T64 Commenced. _____
Sheet ONE of ONE PERCUSSION Completed. _____

Geology	Metres	Graph	Log	Core Loss	Mineralisation	Analyses (ppm)				
						Mn	Ni	Cu	Zn	Pb
Red-brown clayey soil + Maghemite										
Brown gritty CLAY + MAGHEMITE										
Brown clayey SILT with white mica flakes (very powdery sample)	10									
Yellow-orange SAND with coarse white mica flakes	20									
Light brown clayey SILT										
Coarse SAND (with white clay in interval 28-30m)	30									
Clean, clear SAND (with some clay in interval 38-40m)	40									
Coarse, clear SAND (with some gravel in interval 50-52m)	50									
Yellow-orange sandy clay (? v. weathered bedrock)						130	50	110	130	10
Greenish, fine-medium grained SCHIST (initially highly weathered)	60					200	60	100	210	20
* A retrogressed QUARTZ + FELDSPAR + BIOTITE + (?) GARNET PHYLLITE with much muscovite and chlorite. Accessories include magnetite, pyrite, schorl, sphene and apatite. E.O.H 66m.					Au 20.008	430	60	35	220	15
						480	75	35	180	20
						435	60	40	160	5

S. 32° 17' 12"

Completed. _____

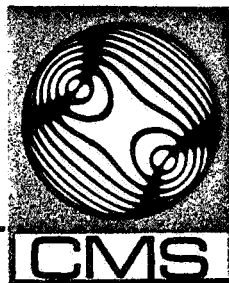
[illegible]

APPENDIX 2

Petrological Report

20 APR 1983

Central Mineralogical Services



39 Beulah Road
Norwood, S.A. 5067
Telephone 42 5659

Mr. F. Bunting
Exploration Department
The Broken Hill Proprietary Co. Ltd.
P.O. Box 559
CAMBERWELL / VIC. 3124

26th April, 1983

REPORT CMS 83/4/6

YOUR REFERENCE:	Letter dated 5.4.1983 Job No. K 130
DATE RECEIVED:	8th April, 1983
SAMPLE NOS.:	MRL 14.552 - MRL 14.562
SUBMITTED BY:	D. J. Gilbert
WORK REQUESTED:	Petrology

H. W. Fander

H.W. Fander, M. Sc.

Copy & Invoice to:
Mr. D.J. Gilbert
Senior Petrologist
The Broken Hill Proprietary Co. Ltd.
P.O. Box 264
CLAYTON / VIC. 3168

REPORT CMS 83/4/6

A suite of eleven percussion drill and rock chip samples was received for petrological examination and brief description, and results are compiled in the attached tables. Descriptions incorporate data from K-feldspar staining tests and microscopic (stereobinocular, petrological) examination of representative thin-sections and offcuts, and include interpretative comments, together with visual estimates of magnetite content.

Summary

This suite comprises entirely low- to medium-grade metasediments with minor associated vein-quartz. Sediments range from strictly detrital arkosic to quartzose psammopelites, with minor to conspicuous Fe-oxide opaques to distinctly jaspilitic types representing silicate facies iron formations. The latter include phosphatic and apparently boron (tourmaline-) bearing types with analogies to the higher-grade regionally metamorphosed types in the Broken Hill area.

Metamorphic effects are characteristic of mid- to upper-greenschist facies of regional metamorphism. Several rocks exhibit essentially hornfelsic fabrics and marginal, mildly retrograde contact effects, reflecting a temporally late but broadly syntectonic granitic alteration halo. General features, both in terms of lithologies and metamorphic effects, thus categorise this suite as of Willyaman character. There are strong affinities with, for example, the ?Early Proterozoic Willyaman metasediments of the Olary Province.

D. Cowan, B. Sc.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
A 1074 88-90m. MRL 14.552 BAL-P1	<u>Garnetiferous Phyllite</u> . K-feldspar, quartz, untwinned plagioclase in varying proportions with pervasive green biotite. Thinly disseminated garnet (almandine) and coarse scapolite ("dipyre").	Fine-grained (mean 50 μ) hornfels-like with a weak phyllitic cleavage. Poikiloblastic garnet, scapolite.	Trace muscovite, very fine schorl, minor traces magnetite, apatite, sideritic carbonate, oxidised	Vaguely polymetamorphic upper-green-schist facies meta-arkosic siltstone/fine sandstone. Faintly laminated with essentially concordant cleavage. Magnetite < 1 %.
A 1075 64-66m. MRL 14.553 BAL-P2	<u>Retrogressed Phyllite</u> . Biotitic, quartzofeldspathic phyllite similar to A 1074, with relatively conspicuous muscovite, fine magnetite. Disseminated retrograde clots of chlorite (after ?garnet).	Analogous to A 1074, but relatively hornfelsic. Minor relict silty, fine sandy clastic quartz.	Traces pyrite. schorl, cloudy sphene. Minor traces pyrite, apatite, patchy limonite.	Close affinities with A 1074, but slightly retrogressed. Magnetite 2-5 % (partly oxidised/martitised). Single chip of fractured/calcite-healed quartz.
A 1076 70-72m. MRL 14.554 BAL-P3	<u>Quartz-Mica Hornfels</u> . Quartz and (brown) biotite with subordinate to minor sericitic plagioclase, sporadic poikilitic flakes, clusters of muscovite, more or less pervasive fine magnetite.	Fine-grained, hornfelsic to weakly directed. Weakly spotted with poikiloblastic muscovite.	Traces schorl, late sideritic carbonate, chlorite (after biotite). Minor traces apatite, corroded relicts scapolite	Relatively hornfelsic metasiltstone/fine sandy siltstone. Poikilitic muscovite is partly scapolite-pseudomorphous. Mean magnetite content is 3-5 %, but variable < 1-10 %.
A 1077 70-72m. MRL 14.555 BAL-P4	<u>Weathered Metapelite</u> . Quartz and extensively martitised/oxidised magnetite with varying proportions of partly degraded/ferruginised biotite, subordinate muscovite. Minor degraded indeterminate porphyroblasts.	Weakly directed hornfelsic (sim. A 1074). Compositionally banded (trend quartz-magnetite/quartz-mica(-magnetite)).	Minor traces schorl, apatite.	Interlamination of low-grade impure (weakly micaceous) metajspilite and metapelite (analogous to A 1074 etc.) Magnetite content variable, approx. 5-75 %, mode 25-40 %, extensively degraded.
A 1078 64-66m. MRL 14.556 BAL-P5	<u>"Metajspilite"</u> . Quartz, green biotite, magnetite and hematite in varying proportions with locally conspicuous apatite, ultrafine colourless ?tourmaline, cordierite and degraded (ferruginised/sideritised) ?staurolite.	Variable, fine- to medium-grained, hornfelsic to phyllitic (where relatively micaceous), banded.	Locally conspicuous poikilitic scapolite (partly replaced by carbonate), patchy biotite-replacive	Compositionally, texturally variable chips consistent with a banded phosphatic silicate facies iron formation. Magnetite content variable 5-50 %, mode 20-25 %.
A 1079 52-54m. MRL 14.557 BAL-P6	<u>Vein-Quartz/Metasediments</u> . Composite sample of vein-type quartz with minor chips of kyanite-bearing mica schist with accessory magnetite, hematite, grading into magnetite-hematite-rich micaceous phyllite, schist.	Coarse, variably stressed vein-type quartz. Schist is variably contorted, granulated (drill-induced).	Traces chlorite. apatite, schorl in schist.	Composite of vein-quartz, quartz-mica schist, and kyanitic mica schist with accessory Fe-oxides; grading into more or less massive hematitic iron formation. Magnetite content widely variable.
A 1080 82-84m. MRL 14.558 BAL-P7	<u>Quartz-Mica Hornfels</u> . Quartz and biotite with subordinate muscovite, minor partly sericitised poikilitic andalusite, conspicuous fine magnetite (variably martitised/oxidised).	Fine-grained hornfelsic to incipiently phyllitic. Weakly banded. Relict silty, fine sandy clastic.	Traces schorl, rare apatite, traces sericitic feldspar.	Typical vaguely polymetamorphic psammopelitic meta-sediment. Magnetite content generally 3-5 %, increasing to 5-10 % in some bands.
A 1081 MRL 14.559 *	<u>Hematitic Quartz-Mica Schist</u> . Quartz, Fe-stained muscovite and degraded/ferruginised biotite with pervasive hematite, minor partly martitised/oxidised magnetite.	Weakly laminated with fine-scale, low-angle discordant schistosity.	Disseminated schorl, minor traces apatite.	Distinctly (mid- to upper-green-schist facies) regional metamorphic characteristics in contrast to the compositionally similar A 1074 etc. Magnetite 2-3 %.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
A 1082 MRL 14.560 *	<u>Hematitic Quartz-Mica Schist.</u> Quartz and pale green biotite with pervasive hematite, subordinate to minor magnetite, disseminated to conspicuous apatite.	Analogous to A 1081.	Traces muscovite, chlorite (after biotite), poorly twinned albite, rare schorl.	Close affinities with A 1081, but distinctly relatively phosphatic in comparison. Magnetite content variable from about 2-20 %, mode 5 %; banded distribution.
A 1083 MRL 14.561 *	<u>Hematitic Phyllite.</u> Quartz and pale green biotite with pervasive hematite, varying proportions magnetite, minor apatite.	Analogous to A 1081, A 1082, but distinctly finer-grained.	Traces cloudy metamict ?monazite; rare schorl.	Affinities with A 1081, A 1082, the main contrast being the finer sizing. Magnetite content is variable, due to banded distribution; range about 5-15 %.
A 1084 MRL 14.562 *	<u>Hematitic Schist.</u> Quartz and hematite with subordinate degraded (illitised, weakly Fe-stained) mica, martitised magnetite.	Analogous to A 1081, A 1082, relatively fine-scale relict banding (lenticular).	Rare schorl.	Similar to A 1081, A 1082, relatively hematitic/weakly micaceous in comparison. Magnetite extensively replaced by martite-hematite, semi-banded, approx. 5 %.
	T.S. 45666 - 45676			
	* THESE SAMPLES ARE THE SAME FOUR SAMPLES (RESPECTIVELY) WHOSE GEOCHEMISTRY IS TABLED IN APPENDIX 4. SEE APPENDIX 4 FOR LOCATIONS.			

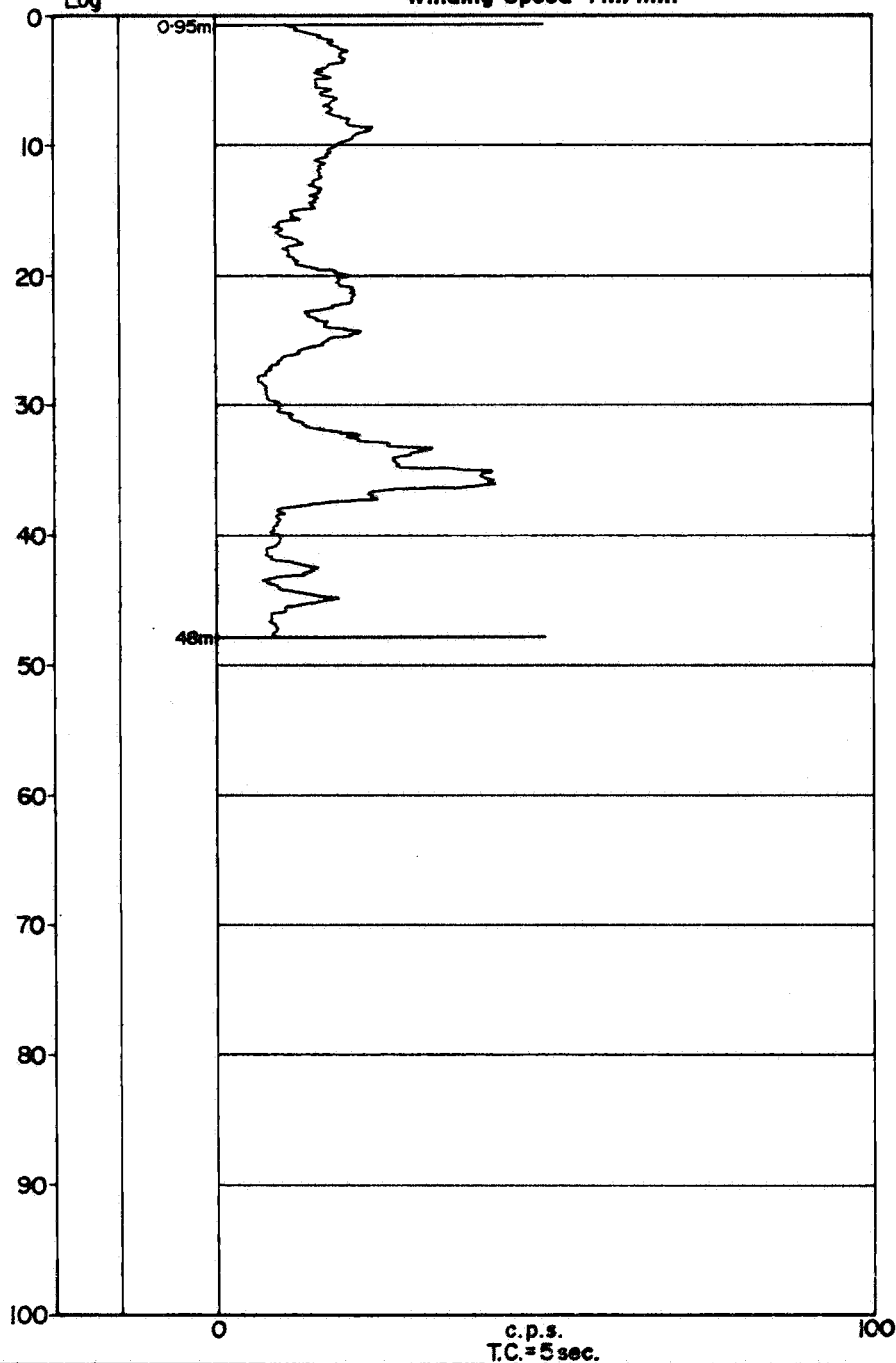
APPENDIX 3

Downhole Geophysical Logs for BAL-P1 to BAL-P7

DRILL HOLE: BAL - PI	DEPTH OF HOLE: 90m
LOCATION: 6429410mN 477320mE	DEPTH LOGGED: 48m
	LOGGING UNIT: SIE T450E
TYPE OF LOG: Gamma	CASING TYPE: PVC to 6m
DATE: 6-5-83	INCLINATION: Vertical

Geological
Log

Winding Speed 4 m/min

Centre
AdelaideDate
24-5-83

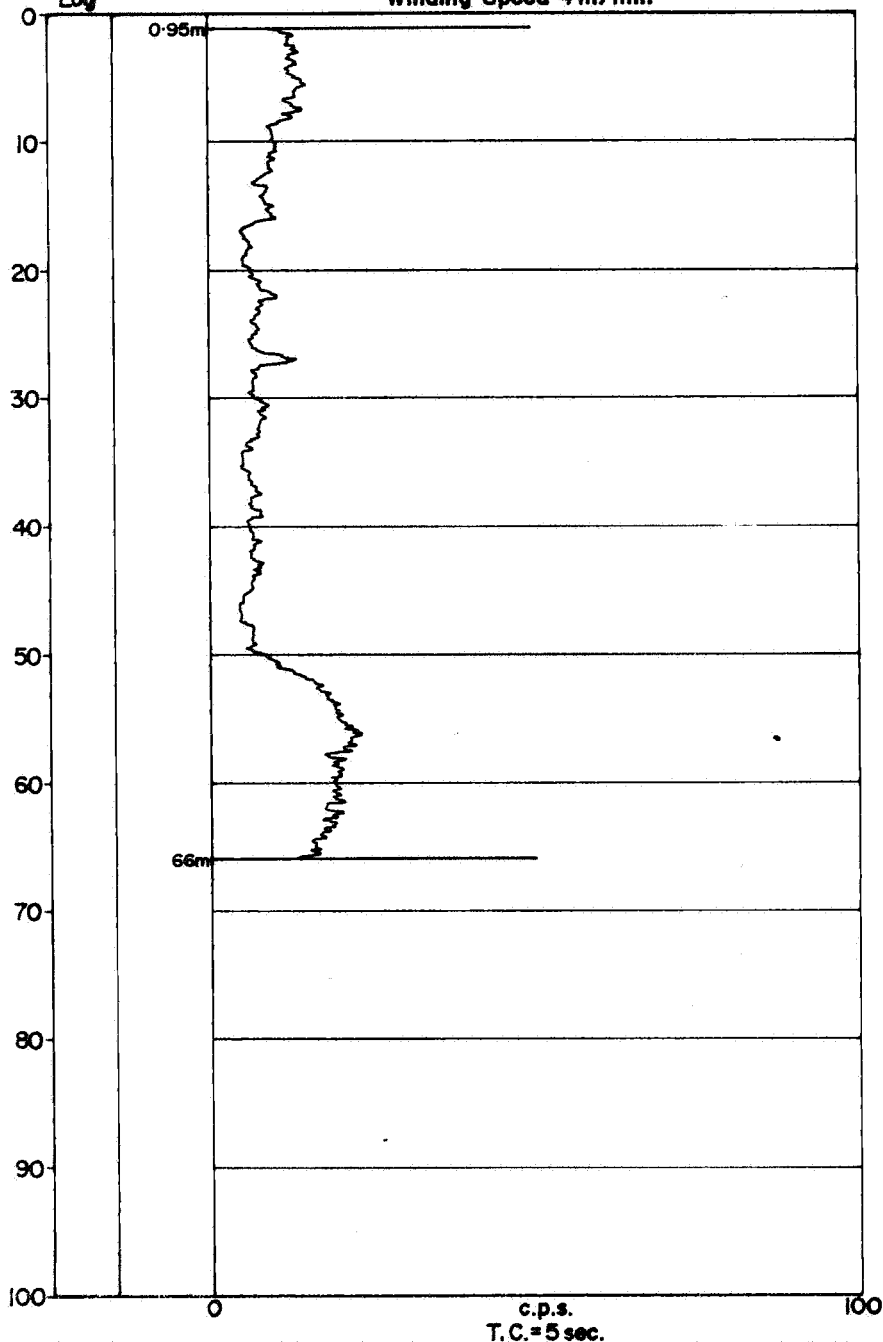
THE BROKEN HILL PROPRIETARY CO. LTD.

E.L.1137 BALLARA, S.A.
DRILLHOLE BAL-PI - GAMMA LOGProject No
6-KI30-1Drawing No.
A4-265

DRILL HOLE: BAL-P2	DEPTH OF HOLE: 66m
LOCATION: 6428480mN 475520mE	DEPTH LOGGED: 66m
	LOGGING UNIT: SIE T450E
TYPE OF LOG: Gamma	CASING TYPE: PVC to 6m
DATE: 6-5-83	INCLINATION: Vertical

Geological
Log

Winding Speed 4 m/min

Centre
AdelaideDate
24-5-83

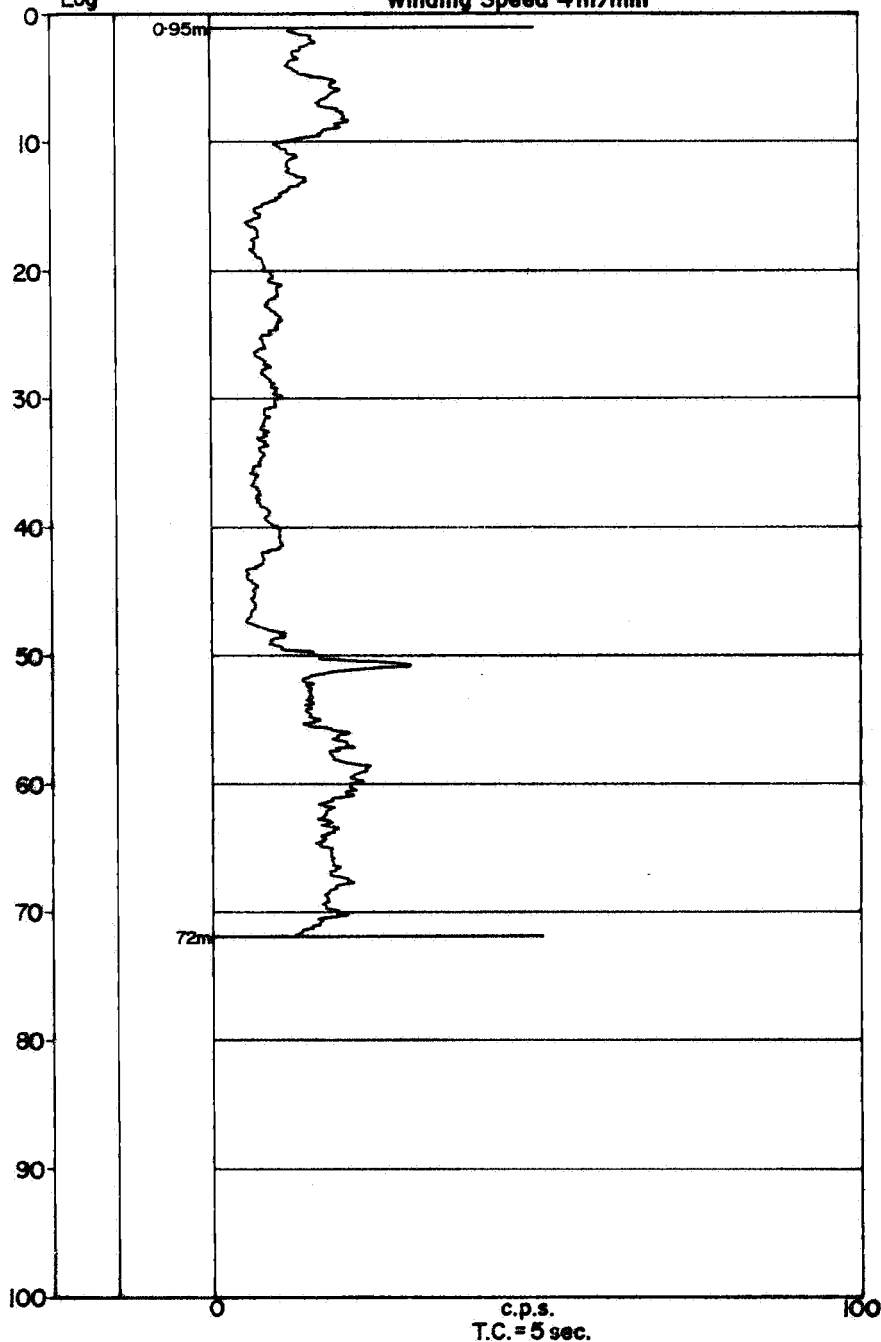
THE BROKEN HILL PROPRIETARY CO. LTD

E.L.1137 BALLARA, S.A.
DRILLHOLE BAL-P2 - GAMMA LOGProject No.
6-K130-2Drawing No.
A4-266

DRILL HOLE: BAL - P3	DEPTH OF HOLE: 72m
LOCATION: 6428240mN 475520mE	DEPTH LOGGED: 72m
	LOGGING UNIT: SIE T450E
TYPE OF LOG: Gamma	CASING TYPE: PVC to 6m
DATE: 6-5-83	INCLINATION: Vertical

Geological
Log

Winding Speed 4 m/min

Centre
AdelaideDate
24-5-83

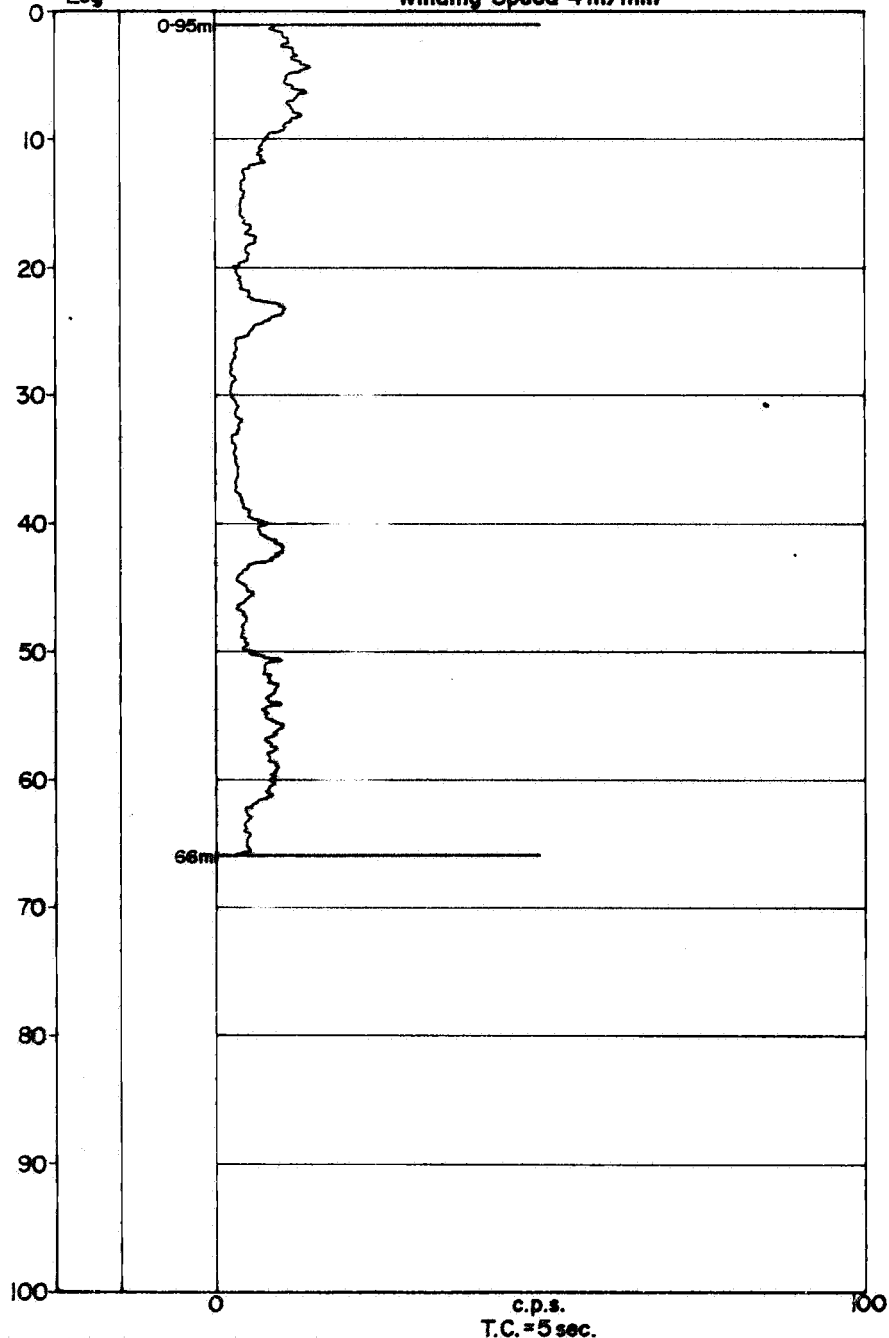
THE BROKEN HILL PROPRIETARY CO. LTD.

E.L.1137 BALLARA, S.A.
DRILLHOLE BAL-P3 - GAMMA LOGProject No.
6-K130-3Drawing No.
A4-267

DRILL HOLE: BAL-P4	DEPTH OF HOLE: 72m
LOCATION: 6427930mN 475570mE	DEPTH LOGGED: 66m
	LOGGING UNIT: SIE T450E
TYPE OF LOG: Gamma	CASING TYPE: PVC to 6 m
DATE: 6-5-83	INCLINATION: Vertical

Geological
Log

Winding Speed 4 m/min



Centre
Adelaide

Date
24-5-83

THE BROKEN HILL PROPRIETARY CO. LTD

E.L.1137 BALLARA, S.A.

DRILLHOLE BAL-P4 - GAMMA LOG

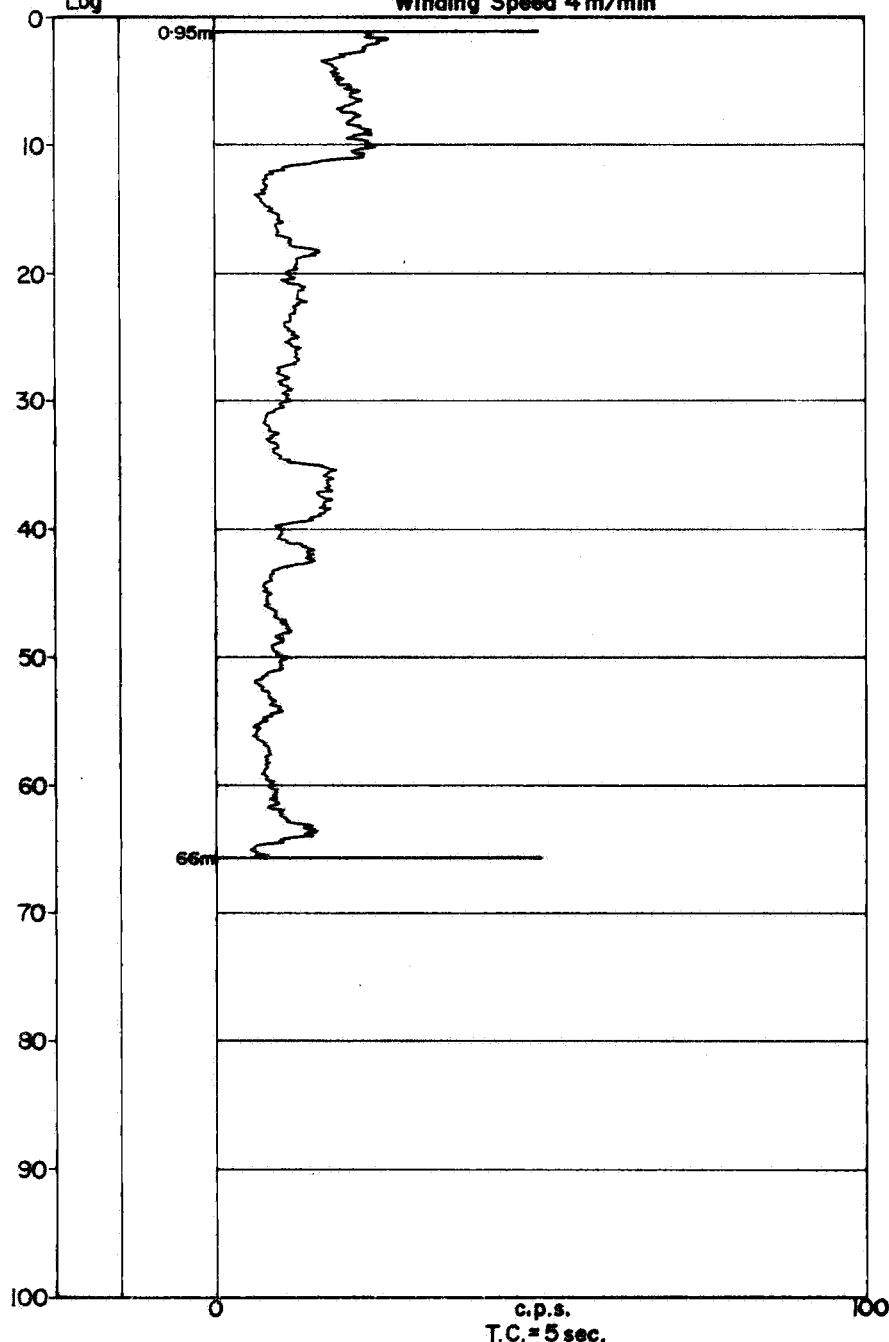
Project No.
6-K130-4

Drawing No.
A4-268

DRILL HOLE: BAL-P5	DEPTH OF HOLE: 66m
LOCATION: 6431160mN 472470mE	DEPTH LOGGED: 66m
	LOGGING UNIT: SIE T450E
TYPE OF LOG: Gamma	CASING TYPE: PVC to 6m
DATE: 6-5-83	INCLINATION: Vertical

Geological
Log

Winding Speed 4 m/min

Centre
AdelaideDate
24-5-83

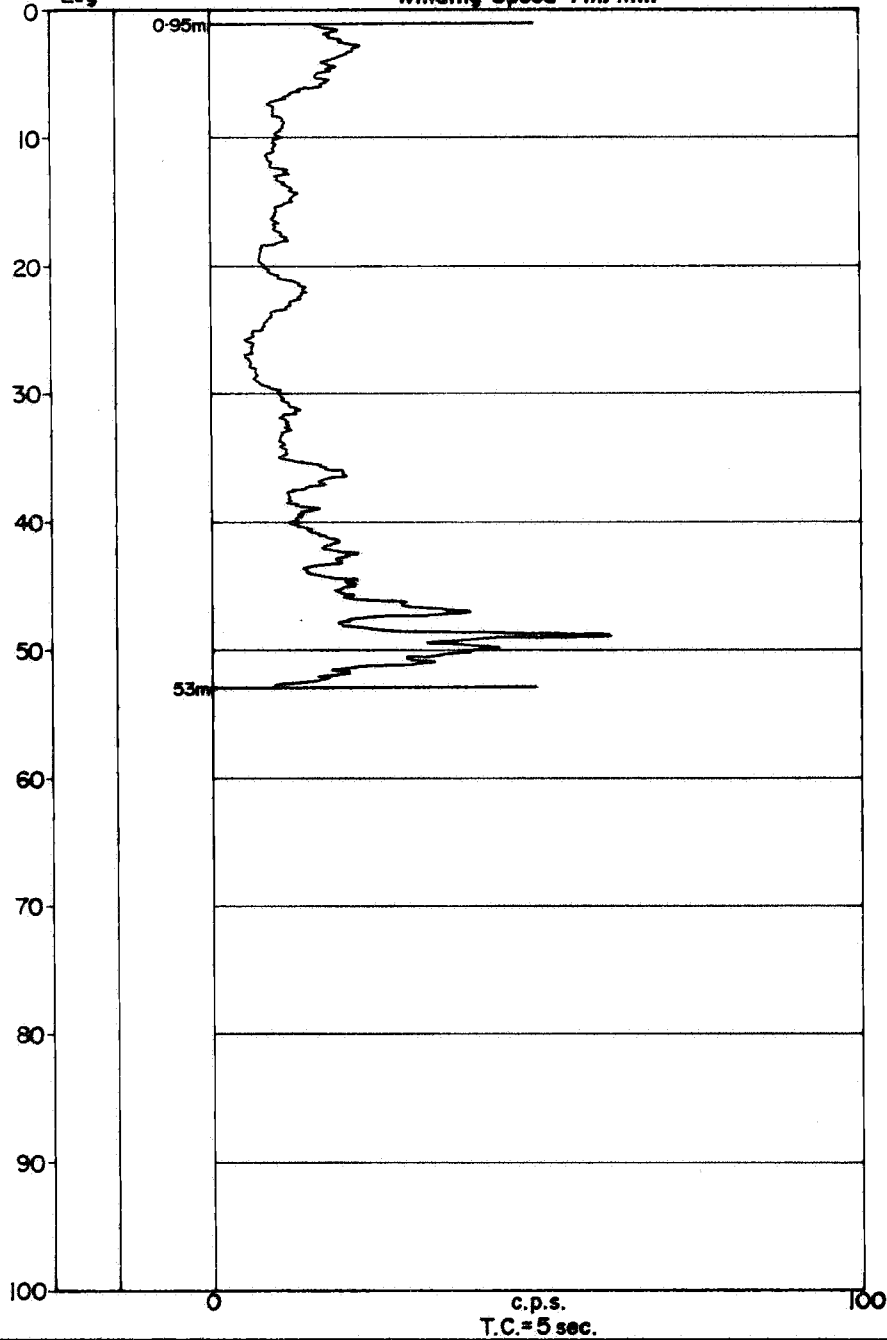
THE BROKEN HILL PROPRIETARY CO. LTD

E.L.1137 BALLARA, S.A.
DRILLHOLE BAL-P5 - GAMMA LOGProject No.
6-K130-5Drawing No.
A4-269

DRILL HOLE: BAL-P6	DEPTH OF HOLE: 54 m
LOCATION: 6429530mN 473450mE	DEPTH LOGGED: 53m
	LOGGING UNIT: SIE T450E
TYPE OF LOG: Gamma	CASING TYPE: PVC to 6m
DATE: 6-5-83	INCLINATION: Vertical

Geological
Log

Winding Speed 4 m/min



Centre
Adelaide

Date
24-5-83

THE BROKEN HILL PROPRIETARY CO. LTD
E.L.1137 BALLARA, S.A.
DRILLHOLE BAL-P6 - GAMMA LOG

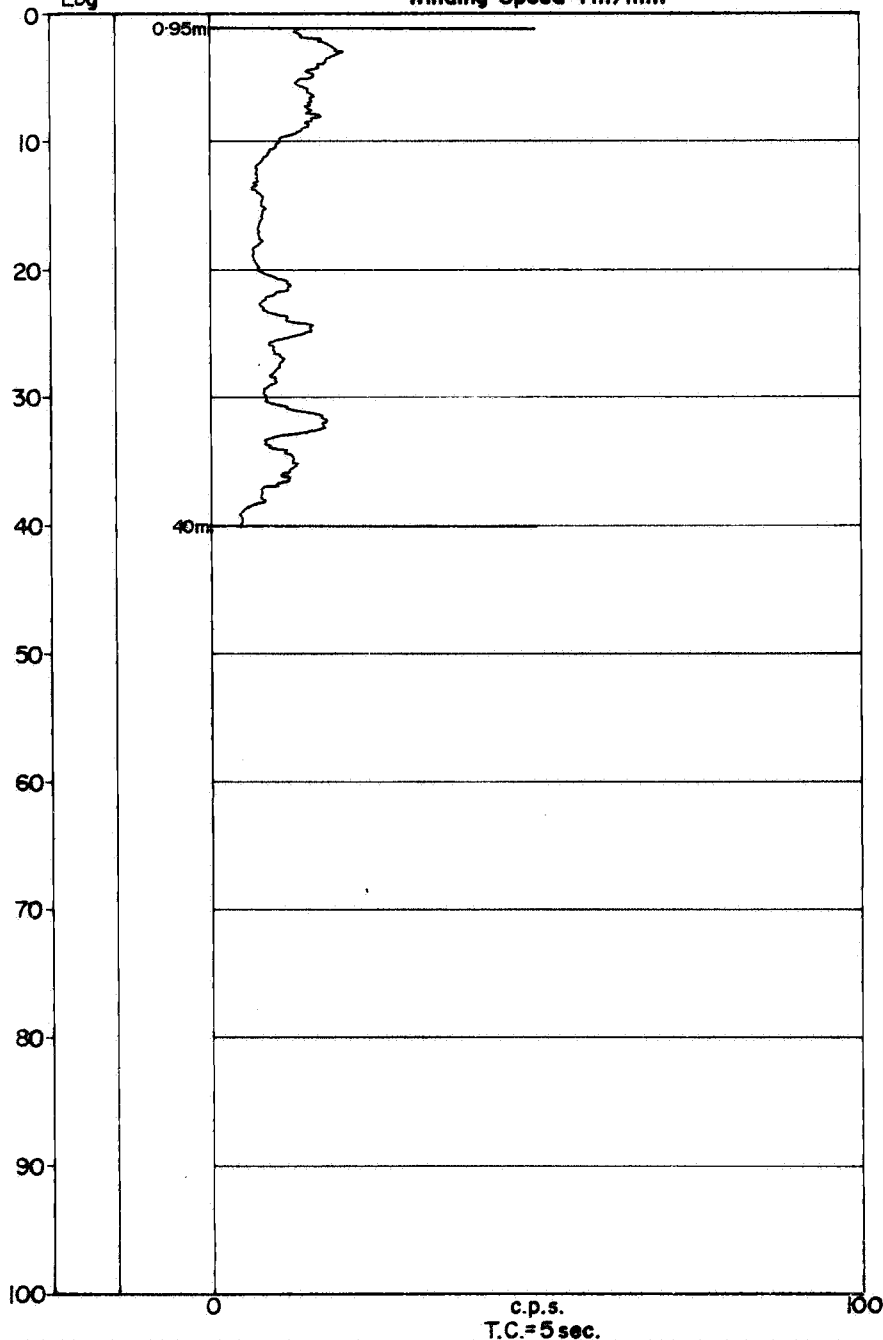
Project No.
6-K130-6

Drawing No.
A4-270

DRILL HOLE: BAL-P7	DEPTH OF HOLE: 84m
LOCATION: 6429 140mN 477270mE	DEPTH LOGGED: 40m
	LOGGING UNIT: SIE T450E
TYPE OF LOG: Gamma	CASING TYPE: PVC to 6 m
DATE: 6-5-83	INCLINATION: Vertical

Geological
Log

Winding Speed 4 m/min



Centre
Adelaide

Date
24-5-83

THE BROKEN HILL PROPRIETARY CO LTD
E.L.1137 BALLARA, S.A.
DRILLHOLE BAL-P7 - GAMMA LOG

Project No
6-K130-7

Drawing No.
A4-271

APPENDIX 4

Geochemical Results

34

ANALYTICAL LABORATORY: ANALABS
Analytical Report Number: 14.2.01.27318

SAMPLE DESCRIPTION

	F	P	Cr	Mn	Fe	Co	Ni	Cu	Zn	As	La	Ce	Au	Pb
BAL-P1: 88-90m*	500	0.085%	65	3100	4.80%	100	120	125	100	1	35	50	BLD	BLD
BAL-P2: 64-66m*	500	0.086%	55	410	5.40%	35	65	60	140	1	40	60	BLD	BLD
BAL-P3: 70-72m*	400	0.082%	65	540	5.30%	30	45	45	125	2	50	60	BLD	BLD
BAL-P4: 70-72m*	200	0.316%	30	200	15.10%	20	40	35	70	4	25	40	0.008	BLD
BAL-P5: 62-64m*	600	0.755%	60	430	22.00%	30	40	10	40	4	25	40	BLD	BLD
BAL-P6: 52-54m*	200	1.000%	50	150	14.30%	20	35	15	50	1	20	45	BLD	BLD
BAL-P7: 82-84m*	300	0.155%	60	410	5.80%	25	35	50	115	1	35	BLD	BLD	BLD
Hematitic phyllite (from dam wall 200M SE BAL-P5)	100	0.067%	85	120	20.95%	20	50	20	20	2	70	60	BLD	BLD
Magnetic schist (bore cuttings from old bore NE corner of dam)	200	0.970%	55	260	14.45%	15	40	10	40	2	40	60	BLD	BLD
Magnetic schist (bore cuttings from old bore 500m SE of BAL-P5)	500	1.143%	50	400	16.40%	20	30	10	50	3	30	65	BLD	BLD
Magnetic schist (material dug out of well 40m W of previous sample).	100	0.379%	70	60	23.20%	15	30	10	20	6	30	55	BLD	BLD
Detection	100	0.003%	5	5	5	5	5	5	5	1	20	30	0.008	5
Method	128	402	401	101	101	101	101	101	101	114	401	401	309	101

Method Codes:

101 : AAS
401,402 : XRF
128 : SIE
114 : AAS after vapour hydride generation
309 : AAS after fire assay fusion

* Drill chips after sieving and washing

BLD = Below limit of detection

All results in ppm unless indicated by "%"